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Q&A with the ACLU

How Security Noose is Tightening on R&D Data Flow

The news media's attention is erratic in regard to the Reagan Administration's fondness for secrecy and restrictions on the circulation of information, including scientific data. But the recent absence of dramatic confrontations doesn't mean the Administration is relenting; rather, it has become craftier at pursuing its goals of ever-greater restrictions. A fulltime observer and active opponent of the process is Allan Adler, who since 1979 has been Legislative Counsel for the American Civil Liberties Union and the Center for National Security Studies. Adler, an authority on the Freedom of Information Act and federal security regulations, spoke with SGR Editor Greenberg on April 17. Following is the transcript, edited by SGR.

SGR. *What changes have taken place during the Reagan Administration in government attempts to control scientific and other scholarly information?*

Adler. The Administration has bolstered the classification system for national security information and has also sought a broad expansion of control over *unclassified* information. This is information that remains unclassified, but nevertheless is subject to government control restricting access and dissemination.

Shuttle Costs May Crimp SSC—Page 2
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SGR. *Where is it written that the government may control information that previously circulated freely?*

Adler. There are 2 main sources. The Administration got statutory authorization from Congress in 1981 in a rider on the Department of Energy's National Security Programs Authorization bill for the creation of a new category of information—unclassified controlled nuclear information. This is a broad category of information relating to security and safeguards matters concerning the Department of Energy's nuclear energy facilities. Though unclassified, they're nevertheless restricted for access and carry civil as well as criminal penalties for unauthorized dissemination.

The DOE nuclear plants are inherently a part of the nuclear-weapons program, so to the extent that such information should properly be withheld from the public because of national security concerns, it should be classified. The legislative rider allows the Administration, in essence, to have its cake and eat it too. They have the broad range of classification authority and the ability to withhold this information as unclassified.

SGR. *Have they tried to invoke this authority?*

Adler. That's not really clear. Although the statutory authority was enacted in late 1981, the Department of Energy then became embroiled in a public debate over the implementing regulations. And it took more than 3 years to finalize a rule to implement the statutory authority. We really have not had an adequate period of time to determine the impact of it.

Some scientists I know who at work at national lab-

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In Brief

The House Science and Technology Committee's Task Force on Science Policy plans to hold hearings May 14 on the suppression-by-libel threat of the scientific fraud study conducted by NIH researchers Ned Feder and Walter Stewart. Their travails, extensively documented in SGR of March 15 and April 1, were reported at length in the *New York Times* on April 22. The Feder-Stewart study identified numerous scientific absurdities and errors in a series of papers published in mainstream journals. Amid warnings of libel from attorneys for 2 authors of the dubious papers, the Feder-Stewart analysis has been praised by editors, but remains unpublished.

NSF Director Erich Bloch privately expresses exasperation at the Pentagon's frantic insistence on security curbs on access to university-based supercomputers supported by NSF. "Anyone can walk into Boeing or dozens of other places and buy 6 hours on a supercomputer, with no questions asked," Bloch recently remarked.

A senior NIH official recently assisted the State Department in studying the health hazards of the "spy dust" that the Soviets are accused of sprinkling around US diplomatic facilities in Moscow. He emerged with the following assessment: "The level of scientific understanding at the State Department is so abysmally low that it is difficult to believe."

*With the AAAS' **Science86** gushing red ink from awindling ad revenues, AAAS Executive Officer William Carey, founding publisher of the editorially bright but financially sick journal, may delay his long-planned retirement to settle affairs for his still-unnamed successor. Last year, Carey said he hoped to be out this spring.*

Particle Physics May Help Pay for a New Shuttle

Never simple, the politics of particle physics has been rendered especially convoluted by the dawning recognition of a peculiarity of the federal budgeting process: The Superconducting Super Collider (SSC) shares a budget category with the space program, which means that the prodigiously expensive SSC must compete directly with the campaign to buy a replacement for the Challenger shuttle.

Budget Function 250—General Science, Space, and Technology—is where both NASA and the Department of Energy's General Science Programs show up on the federal books. This, of course, is no place to be in the opening stages of the Gramm-Rudman era.

The SSC, which is nearing a go or no go decision, according to the Department of Energy (SGR Vol. XVI, No. 4), is supposed to cost some $4 billion spread over about a decade, a sum that would roil the finances of science even in placid times. A shuttle purchase, which no one was even thinking about prior to last January 28, has been estimated at $2.8 billion, but since NASA's budgeting is not noted for precision, no one need take that figure seriously.

There's an increasingly discussed possibility that a private consortium might build a shuttle and lease it to NASA. This arrangement would probably end up costing the government far more than a straightforward purchase. However, the aim under Gramm-Rudman is not to hold down ultimate costs; rather, it's to hold down spending in any one year.

The need for that in Budget Function 250 is apparent in a Congressional Budget Office (CBO) report, "An Analysis of the President's Budgetary Proposals for Fiscal 1987," on which Congress is now deliberating. There's rarely a match between the President's sketch of long-term spending plans and the actual outcome, but opportunities for massive budgetbusting have been squashed by the Gramm-Rudman budget procedures. It is indeed still possible for a program to boom above its previous levels or forecasts, but growth here must be compensated for by decline there.

According to the CBO analysis of the Reagan spending plan, Budget Function 250—which also includes NSF—is scheduled to rise from $9.1 billion in fiscal 1987 to $11.7 billion in 1991. Most of the growth, however, is concentrated in NASA's quietly burgeoning space-station program, which is scheduled to rise from a base of about $200 million this year to $2 billion a year in 1990, a period in which shuttle spending was expected to go down. Congress and the Administration have already slowed that pace, but the space station remains a live program and as long as it is, it will take a major share of any growth.

The 5-year figures for the DOE's General Science Programs show a cumulative increase of a mere $700 million. That includes funds for the Continuous Electron Beam Accelerator Facility, at Newport News, Va., estimated to cost about $300. It does not include construction funds for the SSC. The reason is that DOE insists that it has not officially committed itself to the construction of the SSC; all that it's doing, it insists, is financing studies to guide a final decision.

However, the crash of the shuttle adds a new and dangerous ingredient to high-energy politics. The CBO report says that neither the President's budget nor its own analysis "reflects the possible consequences of the recent explosion of the space shuttle Challenger. Significant budgetary changes will likely result," the CBO stated, "especially if the decision is made to build another shuttle orbiter."

Upping the Ante in SSC Chase

California, with a $500,000 state-appropriated kitty this year for pursuing the SSC and $1 million allotted for next year, is working Capitol Hill to drum up support for the big project. The aim is to win approval to build it and then fight to build it in California.

Under the neutral-sounding title of "Coalition for the Superconducting Super Collider," 91 House members petitioned the President last month to approve the project. "The SSC," they stated, "constitutes an investment in the future competitiveness of our country, both by the training of our next generation of high-energy physicists and by the technology transfer of the discoveries to our private sector."

Of the 91 signatories, 38 were from the 45-member California House delegation. (Texas, with 27 House seats, was second on the petition, with 9 signers.)

The preeminence of Californians in this lobbying effort reflects the fact that the Coalition for the Superconducting Super Collider is a creation of California's 27 House Democrats, who—as is the case with party members in some other states—are banded together to pool their political musclepower. Two full-time staff members serve the general interests of the delegation, among which the SSC now ranks high. In addition, the University of California has donated some staff assistance to the cause.

Though California's House Democrats are leading the chase, the SSC is a bi-partisan issue. In a press release announcing the letter to Reagan, the Coalition for the Superconducting Super Collider stated that the 91 signatories were "led" by Rep. Vic Fazio, a California Democrat, and Rep. Ron Packard, a California Republican.

...Freedom of Information Narrowed by Pentagon

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oratories, such as Lawrence Livermore and Sandia and other places like that, believe it is having an inhibitive effect on what they feel they can write and talk about, even when unclassified material is involved.

The other example has an even broader effect, because it covers a much larger universe of information. That's a rider to the Department of Defense Authorization bill in 1984. It was originally intended to give Defense authority to reject Freedom of Information Act requests for technical data that it might have to release under the Act.

The rider gave the Secretary of Defense authority to withhold technical information with military or space applications that requires a license to be exported from the United States, even if it's unclassified. The realm of such unclassified data subject to export control is quite broad.

"Unclassified but Sensitive"

SGR. *A new category—unclassified but sensitive—has figured in efforts to restrict circulation of scientific and technical information. Is there a statutory or an administrative basis for that category?*

Adler. In this case, the government uses the export-control laws, and that's 2 statutes—the Export Administration Act and the Arms Export Control Act. They're respectively under the control of the Commerce Department and the State Department. And they depend for actual implementation upon 2 lists of technology. The Commerce Department controls a list called the Commodities Control List, which consists of dual-use technology—that is, commercially available technology that may also have military applications, and therefore is subject to export controls.

Under the Arms Export Control Act, the State Department controls the US Munitions List. This is a list of technology for implements of war. Officials in the Defense and Commerce Departments have basically been saying that a good deal of the technical data related to such technology, even though it is not classified, presents a great risk to the US national security, in terms of technology transfer to the Soviets.

SGR. *Is there actual control over material in the category of unclassified but sensitive?*

Adler. There is control in the sense that the government, at least the Defense Department, under the statute has the authority to deny access to it. And it appears to be asserting the right to control access to that information, even when it is not strictly in the possession of the Defense Department.

Pre-publication Clearance Advised

SGR. *Is a university researcher who has a Defense grant for unclassified work theoretically sticking his neck out if he mails an unclassified paper to a colleague in another country without first clearing it with Defense?*

Adler. If that paper is the result of research funded by the Defense Department, then I would say that under their policies, he clearly is sticking his neck out. And there, of course, we run the danger of pre-publication review requirements. These are increasingly becoming routine provisions of research grants and contracts between the Defense Department and private researchers.

SGR. *What about a researcher who has no Defense support and who's uninvolved with classified research, as is the case with NIH and NSF grantees. As a practical matter, does he have to be mindful of these assorted statutes and regulations in dealings with foreign colleagues?*

Adler. As a practical matter, he probably doesn't have to be concerned, since the government can't really monitor everything that's communicated. But the export-control regulations do apply to the export of technical information. If something that's unclassified has been placed in a dual-use category—meaning it has commercial as well as military applications—then it's entirely possible that a scientist may find himself in violation of the export-control laws by communicating unclassified data.

SGR. *Then, theoretically, if someone in the government wants to get mean about it, the legal basis is there.*

Adler. Definitely.

SGR. *Can the reading of a paper at an open meeting in the US be interpreted as an export?*

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...Export Rules Cited to Bar Visits to Computers in US

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Adler. Yes. And that's essentially the basis for the government's assertion of the right to restrict access to the supercomputer facilities, on the ground that computer technology constitutes export-control technology to which foreign-national access, even within the US, should be restricted as part of the export restrictions.

SGR. *Has the ACLU been asked for legal assistance or advice in dealing with restrictive provisions in DoD contracts?*

Adler. We've discussed this with a number of people. The difficulty is that by doing it as a contractual term, the government escapes any basis for a constitutional challenge, for example, on the First Amendment ground that such provisions restrict the rights of speech and communication of the researchers. What they've essentially done is negotiate at arms length the contractual terms, and the researchers have voluntarily accepted them as a *quid pro quo* for the government's funding. The Administration has been very careful to try to operate largely through the provisions of grant instruments and contractual relationships. Because of that, there really has been no ground for us to enter such a case or for anyone to bring such a case to us.

Reins on Ex-Government Employes

SGR. *What's the status of restrictions on writings by former government employes?*

Adler. That issue first arose in the context of the CIA's practice of requiring all employes to sign agreements both when they enter service and when they leave CIA employment. Such agreements were upheld in the Supreme Court's decision involving Frank Snepp, a former CIA official. That was a case in which the Supreme Court basically just shunted aside the First Amendment arguments and treated the issue in terms of fiduciary trust obligations and contractual obligations.

In 1983, the Reagan Administration, through a Presidential Directive, National Security Decision Directive 84, intended to extend this kind of pre-publication review lifetime secrecy obligation to all senior government officials who had access to a highly classified category of information, SCI, sensitive compartmentalized information. That pre-publication review policy became quite controversial. Ultimately, the implementation of the policy was halted by a legislative roadblock—the Mathias-Eagleton amendment to the State Department Authorization Bill.

Although the Administration, in early 1984, ultimately agreed that it would not go ahead with plans to implement the secrecy agreement requirement, it has turned out that, in fact, the Administration didn't depend upon NSDD 84 in order to spread these requirements throughout the government. In early 1981 and 1982, prior to the President's issuance of NSDD 84, we've now learned, the Defense Department and the State Department, at the behest of the Director of Central Intelligence, instituted these requirements among their senior officials with access to SCI.

They did it on a contractual basis. The officials are required, as a condition of attaining access to such information, as necessary for performing their duties, to sign such agreements. And the pre-publication review obligation extends for the rest of their lifetimes after they

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GAO Surveys Gifts from Japan

Financial ties between Japanese organizations and American universities have aroused some curiosity on Capitol Hill, and as a first step toward assessing what's going on, the General Accounting Office (GAO) is undertaking a survey to catalog these dealings.

The GAO, which performs studies and investigations exclusively for the Congress, was asked to take the assignment by Senator Lloyd Bentsen (D-Texas), of the Joint Economic Committee. Bentsen initially was interested in the issue of American access to Japanese research, but dropped it when the GAO suggested that American linguistic ineptitude, rather than Japanese wiles, appeared to be the main cause of limited American use of Japanese research.

In consultations between the Senator and the GAO, it was then decided to take a look at the growing number of gifts and deals between Japanese organizations and American universities. GAO says that from press reports, it's aware of some of these, but that no one knows how many are in existence and what conditions have been agreed to by the parties. In some cases, the Japanese-American dealings involve endowment of chairs—Toyota recently staked one at Rockefeller University for $1.5 million. In others, there are extensive research ties, as is the case at MIT.

The study, based at the GAO's San Francisco office, is just a reconnaissance operation at this stage. But the Congress has often heard that Japan skillfully exploits research that was initially performed in the US. The inquiry about dealings with universities is tinged by concerns that these deals are inspired by something beyond Japan's philanthropic spirit.

...White House Research Directive Came with a Joker

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leave government employ. It allows the government to review, in order to determine whether there is any classified information, anything that they may write.

SGR. *Would this apply, let's say, to an engineer who leaves government service and goes to work for a university or industrial firm and then wants to publish technical papers that relate to his government experience?*

Adler. Theoretically, it would apply.

SGR. *Then it's not limited to narrative text, such as memoirs or commentary?*

Adler. It applies to anything written. The irony, of course, is that such an obligation cannot apply to one's oral remarks, since there cannot be pre-publication review of that. The implication would seem to be that the government would rather have people speak off the cuff—a situation where they obviously present a greater danger of disclosing sensitive information than when they are writing and using their careful, considered judgment. The requirement of submitting any manuscript intended for publication is enforceable by civil action for breach of contract.

Export Controls and Basic Research

SGR. *The long-awaited Presidential directive dealing with circulation of basic research publications finally came out last fall (National Policy on the Transfer of Scientific, Technical, and Engineering Information, SGR Vol. XV, No. 17).*

Adler. It was long in coming, and when it came it was by and large a great disappointment to the academic and scientific community, and justifiably so. The Administration appeared to be giving assurance that there was freedom to publish any kind of fundamental research and technical data associated with it, so long as such information was not subject to classification. And then it took away that freedom by saying that such publication practices had to be consistent with other applicable law. Of course, the issue has always been whether or not Congress intended the Export Administration Act and the Arms Export Control Act to be utilized in the sense that they can restrict what can be published by researchers. Those are the principal laws, but the Trade Secrets Act and the Atomic Energy Act can be read into this, too.

SGR. *On the still-unsettled issue of access of foreigners to supercomputers in the US, the universities involved insist that they don't want to play policeman at the door to the computer center. But apparently they have no objection if foreigners are kept out by denial of visas (SGR Vol. XVI, No. 4).*

Adler. The McCarran-Walter Act (of 1952) has long given the Executive Branch very broad discretion, almost absolute discretion, to determine what foreign nationals will obtain visas to come into this country. Before the supercomputer issue arose, back in 1982, very quietly, without any new statutory authority—without even issuing any new regulations—the State Department announced a new policy. It said it would henceforth interpret the authority given to the Secretary of State under the Act as allowing the State Department to deny visas to individuals who were suspected of coming into this country for the purpose of illegally obtaining export-controlled technical information.

The scientists who are now wrestling with the supercomputer issue should have seen the writing on the wall at that time. There have been instances in the past where universities have invited foreign nationals to conferences, where visas have been denied, particularly for individuals from the Soviet bloc. The universities, of course, prefer not to serve as an adjunct of the government, and properly so. But it leaves the government with very broad discretion to decide who can and cannot come into this country for purposes that, we believe, would largely be protected under the First Amendment if they were in the country. In other words, talking to American scientists about their research fields and being able to utilize certain unclassified facilities.

Response of Universities

SGR. *Has the university community been alert to these issues?*

Adler. The universities have been quite sensitive to the issues. But the universities are caught in the awkward situation of depending on the federal government for most of their research funding, including an increasing share from the Defense Department. They're not eager to be seen as biting the hand that feeds them. Though they have raised cries about academic freedom, they prefer to try to negotiate quietly, rather than confront the Defense Department. They have not gone to Congress in any substantial way to bring attention to the impact of the Administration's broadened interpretations of its statutory authority. The universities have not made use of their alumni network, which I'm sure can focus quite a lot of power on the Administration on these policies.

The universities prefer to try to work these things out peaceably, in a conciliatory fashion, through the ongoing discussions in the DoD-University Forum. But I don't think they've gotten very much out of that.

SGR. *They've gotten what they consider to be concessions.*

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...Conflicts Avoided by Barring Foreigners at Meetings

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Adler. It depends on what you consider concessions. The Association of American Universities, for example, was willing to reach agreement with the Defense Department last year after the last major instance of a conference being interrupted by Defense to prevent certain papers from being presented in open session [The April meeting of the Society of Photo-Optical Instrumentation Engineers, where 25 papers were ordered withdrawn]. The AAU was willing to accept the Department's representations of why, despite years of negotiations, they still ended up coming in at the last minute, disrupting the published program of the conference, and essentially insisting that 1 out of every 5 papers scheduled to be presented had to be restricted.

A portion of the research community, notably the engineering societies, has taken the position that they would rather not have foreign nationals attend at all than have to deal with the vagaries and ambiguities of the Administration's assurance that it will not be an overzealous censor. The academic and scientific community remains at the mercy of the Administration's policies on these matters.

Curbs are Wide-Ranging

SGR. *Comparing what's happened since 1981 with the previous decade, do you feel that the curtains have been pulled down around the scholarly enterprise?*

Adler. Yes, that's certainly true, but it's not just the scholarly enterprise. This Administration has put the nation's press on notice, as well, that it considers a large amount of information about government policies and activities to be dangerous for general public access. The Administration's penchant toward secrecy has been quite visible in terms of its readiness to use lifetime secrecy agreements, the polygraph, and restrictive reporting requirements for contacts with the press and other individuals seeking information from government employes that the Administration regards as sensitive.

The Administration has refused to set any reasonable boundaries to what it considers to be national security information. No one can depend upon the definition of national security information as a category of information that is separate and apart from the large universe of information which may be freely communicated without concern about government recourse.

One good example is a directive issued in September 1984 by the President, National Security Decision Directive 145, titled "National Policy on Telecommunications and Automated Information Systems Security." Because of the threat of terrorists, hostile intelligence services, and, in the President's view, even the criminal element within the US, the Directive sought to set up a structure and policymaking entity that would develop a government-wide security policy to protect telecommunications.

But within that Directive, the President does not seem to be willing to limit in any real way what kinds of information systems should be considered prone to possible exploitation by these threatening groups. The Directive not only is not limited to classified government information, but it also strongly suggests that the President would like to see the same kind of telecommunications and automated information systems security policy applied to the private sector, where the President seems to believe that there is privately generated, non-government information which nevertheless is sensitive in security terms.

When pressed for examples, they say that in certain contexts, things like crop-production and business forecasts and weather reports could all have a national security shading to them. The problem is that there is no definition.

1st Amendment and R&D Data Security

SGR. *Do you see any sign of the Administration becoming more aggressive in its attempts to control information?*

Adler. The government's argument in the *Progressive* case may once again be raised. It was based upon an interesting interpretation of technical data as not being speech protected by the First Amendment. The court never was able to rule on that argument because the

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OTA Forms Science-Policy

The Office of Technology Assessment (OTA) is establishing a small standing staff to conduct science-policy studies for the Congress.

The group is headed by Nancy C. Naismith, OTA's Program Manager for Science, Education and Transportation. It grows out of OTA's work for the House Science and Technology Committee's Task Force on Science Policy, which is nearing completion of a 2-year study of government-science relations. On assignment from the Task Force, OTA produced studies titled "Demographic Trends and the Science and Engineering Work Force," "The Regulatory Environment for Science," and a study for hearings titled Research as an Investment.

Assigned to the new group are OTA staff members Eugene Frankel, Lisa Heinz, and Kathi H. Mesirow.

...UK Seeking Civilian Gain from Military R&D

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gree similar because of the large share they assign to defense research—about 25 percent of all R&D spending. The US spends even more—about 30 percent of the national total going to defense; in terms of the military's share of government spending on R&D, the US figure is a western whopper, amounting to over 70 percent of all federal funds for R&D. Meanwhile, Japanese spending on military R&D is a trifling amount—reported at 2 percent of the national R&D pie, while West Germany spends about 10 percent.

With little of commercial value spinning off from the UK's relatively heavy investment in military R&D, the accent on defense spending is a matter of growing concern in Britain, where the general trends in research have recently come under critical scrutiny by a team of civil servants attached to the Cabinet Office. In pursuit of marketplace payoffs from the UK's heavy expenditures on military R&D, the government has joined with a group of major financial institutions, including Barclays Bank, to form Defence Technology Enterprises. The new creation is intended to be a privately run marketing organization for gathering technical achievements from Britain's military research establishments and pushing them into the commercial sphere.

Whatever the origin of the current sluggishness, it persists in its resistance to change. After all, similar criticisms were being made about Britain and R&D even before World War II. As before, there's general agreement that without major changes in the culture of R&D here, the outlook for Britain remains poor.

Is the rest of Western Europe likely to defy that prognosis? As usual, gloomy forecasts abound. But, as described above, close examination of the numbers indicates that the research gap isn't uniform and in many important fields, it isn't as wide as the alarmists contend.—Peter Marsh

(The author is technology correspondent for the *Financial Times* of London.)

Security

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case was mooted. But the fact is that the Reagan Administration, as it has viewed many other areas of otherwise settled law protecting freedoms, has had an eye toward revisiting some of those areas, believing that in the current political climate and given the favorable hearing that its arguments receive in the Burger court, that it might get different rulings.

I think that the academic and scientific community might well be concerned about future instances where prior restraint may become a reality, where the government's assurances that certain categories of information that will not be subject to restrictions will continue to be in flux, and ultimately may be changing, depending upon the political considerations of the Administration.

The academic community has been fairly aggressive in going before Congress on funding issues, but it also has to realize that it's just as important to take up these policy issues with Congress. They should not allow the concerns about academic freedom to remain hollow.

SGR. *Have there been occasions when the academic community neglected these issues in Congress?*

Adler. The issues have been raised at a number of [non-legislative] hearings before the House Science and Technology Committee. The problem has been where there was a concrete [legislative] opportunity for the issue to be directly addressed. That was over the past 2 Congresses, when the Export Administration Act was up for renewal. The academic and the scientific communities allowed themselves to be shut out, to be only a fringe element, while the main concern before Congress was the disputes between the business community and the national security establishment.

I think that a greater presence of the academic and scientific community might, in fact, have resulted in a substantial policy statement in the Act, perhaps a redefinition of the term "export," and other statutory protections that would have dealt a great blow to the Administration's theory of its power in this area.

SGR. *Does the ACLU get any support from the universities on these issues?*

Adler. MIT has been at the forefront of concern about these issues. [MIT President] Paul Gray is one of the strongest advocates on the academic freedom issues. The former Legislative Director of the ACLU, John Shattuck, is now the Vice President for Government Relations at Harvard, and he has continued to raise these issues.

But, again, when the universities band together and they utilize their alumni they can show a great deal of clout. But they simply have not chosen to do so. The education associations and scientific societies monitor these issues and they engage in dialog with the Defense establishment to try to work out these problems. But they don't desire to confront the Administration.

SGR. *The universities apparently believe that they can successfully reason with the Administration.*

Adler. And the Administration has in large part found that that kind of process works greatly to its favor. It doesn't cost them anything and it still leaves them all the options they desire in terms of asserting restrictions and controls.

Europe Ponders Research Lag Behind US and Japan

London. At gatherings these days of Western European industrial and scientific leaders, one topic invariably arises—the research gap that separates the Old World from Japan and the US. The focus is not just on shortfalls in expenditures relative to Europe's 2 great competitors, though these are real enough. Along with that worry, there are deep anxieties about Europe's ability to translate the research that it does perform into salable products.

The conventional wisdom holds that Europe is a laggard in performing research and making it pay off commercially, and that it's also falling further and further behind in both departments. However, a detailed examination suggests that, while things are bad, they're not quite as dismal as the doomsayers on the conference circuit make them out to be.

In several major, traditional industrial sectors—chemicals, machinery, automobiles, and aircraft—Europe is performing quite well in traveling the route from R&D to marketplace success. And in the new fields of high-tech, including biotechnology, food sciences, and some aspects of factory automation, the prospects appear reasonably good. The big weakness, of course, is in computers and related electronics, but Europe realizes that, which is one reason that it has embraced the Eureka program proposed by France (SGR Vol. XVI, No. 5).

The basic statistics show that Western Europe invests in R&D about 12 percent less per head than Japan and only slightly more than half the comparable sum spent in the US. Of the approximately $200 billion that the non-Communist developed world now spends on R&D, the US, Western Europe, and Japan divide up the cake in the rough ratio of 5:3:2. But while Europe has been increasing its R&D spending in recent years at the plodding rate of 4 percent annually, research investment has risen by 6 percent in the US and 10 percent in Japan.

An important and often overlooked fact is that levels, quality, and priorities of R&D vary considerably from one European country to another. There are greyhounds and tortoises, according to an analysis by Pari Patel and Keith Pavitt, of the Science Policy Research Unit at Sussex University. Examining R&D figures compiled by the Organization for Economic Cooperation and Development, they found that from 1967-82, France, West Germany, and Italy increased their R&D spending by a respectable 5-6 percent a year. Ireland, Sweden, and Belgium raised their R&D by more than 6 percent per annum during the same period. The worst performers were Holland, 1.5 percent; Switzerland, 1.2, and Britain, 0.9.

A growing aim among Europe's managers of industrial policy is to get industry to invest more in R&D, not only to lighten the load on taxpayers but also to focus industry's attention on seeking profitable R&D ventures. It's noteworthy that in Japan and Germany, private firms contribute about 60 percent of the national R&D spending; in the US the figure is somewhat over 50 percent and is rising. But in France and Britain, industry finances only about two-fifths of national totals.

The positions of France and Britain are to some de-

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Newsletter on Research in France Offered by Washington Embassy

France, eager to expand scientific and technical collaboration with the US, will start publication next month of a bimonthly English-language newsletter on French R&D activities. Titled *French Advances in Science and Technology,* the newsletter will be published and distributed by the Science and Technology Office of the French Embassy in Washington.

An 8-page prototype issue is available upon request, as are regular subscriptions, all for no charge. Address: Embassy of France, Science and Technology Office, FAST, 4101 Reservoir Rd. NW., Washington, DC 20007.

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